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ABSTRACT

Organizational differentiation of students is defined as the division of a student body into subgroups (classes, sections, streams) of a relatively permanent character for instructional purposes. A vast body of research exists on the effect of organizational differentiation, especially the effects of grouping according to ability. No coherent pattern of results emerges from this research. It is argued in this paper that the inconclusiveness o f the research is due not only to methodological problems, but also to the theoretical meagerness of the research. An attempt is made, therefore, to specify the crucial dimensions of the organizational differentiation. This conceptual framework is then used in the formulation of a set of mechanisms that may account for a relationship between organizational differentiation and student behavior. The set of hypotheses arrived at are used to reevaluate the existing research. Most propositions deal with the effect of organizational differentiation on student aspirations and beliefs, on between-classroom variation in achievement, and on the influence of family background on academic accomplishment. (Author)

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ABSTRACT

Organizational Differentiation of students is defined as the division of a school's student-body into subgroups (classes, sections, streams) of a relatively permanent character for instructional purposes. A vast body of research exists on the effect of organizational differentiation, especially the effects of grouping according to ability. No coherent pattern of results emerges from this research. It is argued in this paper that the inconclusiveness of the research is due not only to methodological problems, but also to the theoretical meagerness of the research. An attempt is made, therefore, to specify the crucial dimensions of the organizational differentiation. This conceptual framework is then used in the formulation of a set of mechanisms that may account for a relationship between organizational differentiation and student behavior. The set of hypotheses arrived at are used to reevaluate the existing research. The main body of propositions deals with the effect of organizational differentiation on student aspirations and beliefs; on between-classroom variation in achievement; and on the influence of family background on academic accomplishment.

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1. Introduction

The division of a school's student body into subgroups of a permanent character can be termed organizational differentiation. Any educational system assigns students to groups for instructional purposes. The existence of classes, grades, sections, etc. defines formal education in contrast to the learning and training that takes place in the family or in work- and play-groups. The term organizational differentiation stresses the reference to a deliberate and formal structuring of a student body initiated by educational authorities for instructional purposes.

Organizational differentiation takes a variety of forms. A recent survey of research and practices in ability grouping--only one aspect of organizational differentiation--lists twenty-six different practices found within the United States alone (NEA, 1966). Some forms of differentiation are nearly universal; for example, age-grade grouping. Often a pattern of differentiation is specific to a national educational system or a subset of it. The most marked contrasts in organizational differentiation exist between nations. Substantial within-nation variations in differentiation can be caused by a non-simultaneous introduction of new forms of differentiation in a period of reform, as was recently the case in England and Sweden, or by a decentralization of authority in educational matters, as in the United States.

A vast body of research exists on the effects of organizational differentiation. Especially prominent is research on the effects of an assignment to groups according to ability. Several comprehensive surveys of the literature exist (Goldberg, Passow, and Justin, 1966; NEA, 1968; Yates, 1966). It is a common conclusion in these surveys that no coherent pattern of results emerges from the existing research.

The inconclusiveness of the research may be explained partly by the high number of studies where the methodology seems inadequate or inappropriate. The result of many studies, thus may be questioned because of peculiarities of the populations studied. Results are often obtained from short-term studies, where the effects can be expected to be long-term. The experimenters often do not control other significant variables, such as teacher behavior.

The methodological problems alone cannot explain the contradictory results. Carefully designed and executed studies do exist, and the inconclusiveness of findings remains. Hence, it is tempting to conclude that this aspect of the social organization of schools does not have a significance that justifies further attention.

Closing the issue with this conclusion seems unsatisfactory. It is puzzling that such a pervasive aspect of the environment of students cannot be found to have a more systematic effect on their behavior. The organizational differentiation of students determines whom a student will have as classmates, and by defining the routes to various educational ends, it will also determine the opportunities for attaining these educational ends. It seems a very reasonable assertion that both consequences

of the organizational differentiation--the composition of the classroom and the opportunity structure--are related to the behavior of students.

Such assertions are never made in the existing studies, however. Nearly all relate a pattern of organizational differentiation to achievement or some other performance measure, without specifying the mechanisms that would account for the predicted relationship. Relevant intervening variables are ignored and the possibility of stating under which conditions a given result is to be expected is bypassed.

The inconclusiveness of the existing research, hence may be explained not only by methodological problems, but also by the theoretical meagerness of these studies. It seems, therefore, essential to a reevaluation of the existing research, to specify the mechanisms accounting for a relationship between organizational differentiation and student behavior. This task, which amounts to placing the organizational differentiation of students in the context of sociological determinants of learning, is the focus of this paper.

2. Organizational Differentiation and Determinants of Learning.

A variety of characteristics of a student's behavior can be taken as the variables affected by organizational differentiation. This paper focuses primarily on the relation between differentiation and achievement, and the introduction of other dependent characteristics will be justified in terms of their relation to achievement.

The isolation of achievement and organizational differentiation from other variables is claimed above to be a reason for the inconclusiveness of the existing research. The remainder of this section, therefore, gives a brief outline of the variables that are relevant for an attempt to link differentiation and achievement, and provides a starting point for the conceptualization of their relation to the main independent and dependent variable.

2.1 Individual Determinants of Learning.

A great number of characteristics have been assumed relevant to learning on the individual level. Most research in the sociology and social psychology of learning has broadly conceived of learning as determined by the following set of variables: (1) cognitive skills, such as intelligence, creativity, etc., which determines the ability to assimilate, memorize, and apply material; (2) motivational components, such as need to achieve, which determines the amount of effort a student will display; (3) values and aspirations which determines how crucial learning, as an activity, is to a student; and (4) certain sets of beliefs, such as "control over the environment."

The underlying conceptual model is often one in which motivation and values determine what will be the performance resulting from a given level of cognitive skills or ability. Because most research is cross-sectional, little is known about the dynamics of the interrelationship between these variables; for example, how values and motivation affect the development of cognitive skills.

The causal status of the individual level variables mentioned is to some extent doubtful. It is not clear from the literature to what extent aspirations and beliefs are causes rather than consequences of achievement. Even if assumed operative for achievement, it is unclear how they affect achievement; whether, for example, they only constitute necessary but not sufficient conditions for the operations of other factors on achievement.

2.2 Interactive Determinants of Learning.

The individual level characteristics are susceptible to environmental influences, if not completely determined by them. Variations in achievement, therefore may be related to characteristics of an individual's social environment, the individual level characteristics being intervening variables.

The literature suggests a variety of variables as potential measures of the operative characteristics of the environment. Most prominent are variables delineated according to the actors who are thought to be influencing the student's behavior. There are three sets of main actors--family, peers, and teachers--and for all three sets the literature documents significant relationships to achievement.

A massive documentation of the impact of these actors is provided, for example, by the Coleman Report (Coleman, et al, 1966). The report shows how characteristics of all three sets of actors accounts for variation in achievement--characteristics of the student's family background

being uniformly the most important. Characteristics of peers are strongly related to achievement, too, increasing as the students become older. This development is also found with regard to such teacher characteristics, as their verbal ability. Both characteristics of peers and of teachers are, in addition, found to be more strongly related to achievement the more unfavorable the student's background. These findings concerning the increasing influence of peers and teachers on achievement and the interaction with family background are very relevant to the focus of this paper. We shall attempt to show how the effects of the organizational differentiation may be partly attributed to its impact on peer and teacher characteristics.

The underlying model explaining the effect of these variables on achievement is one in which it is assumed that changes in individual level determinants of learning are brought forward through the individual's interaction with the three groups of actors; for example, peer group influences are the transmission of values and norms, relevant for achievement, to the individual in his interaction in these groups.

2.3 Structural Determinants of Learning.

Although the most consistent results regarding environmental effects on achievement are attributable to characteristics of persons with whom the individual is or has been in close interaction, these variables hardly exhaust the list of environmental variables assumed relevantfor achievement in existing research. Two sets of variables,

neither of which are characteristics of a student's interactive relationships, should be mentioned: the physical environment in form of school facilities, and structural characteristics of the school, such as the reward structure (for example, the grading system), school size, faculty organization, and--the variable under consideration here--the organizational differentiation of students.

These characteristics may operate on individual achievement directly by affecting individual level determinants of learning, as does the grading system when it has an effect on student motivation, or they may affect a student's behavior indirectly, as in the case of the physical layout of a school influencing interactive relationships. The effect on achievement, if any, is in this case a function of the extent to which interactive relationships are relevant for a student's achievement.

In analyzing the effects of the organizational differentiation of students the problem then becomes one of answering two questions: (1) In what ways may the organizational differentiation affect individual determinants for learning? (2) In what ways may it affect characteristics of a student's interactive relationships that are relevant for learning?

3. Dimensions of Organizational Differentiation.

A review of specific patterns of organizational differentiation would be one way of answering the question of how differentiation affects achievement. This review could be substantiated with whatever empirical evidence there is.

This approach hardly seems worthwhile. The empirical evidence is unsatisfactory and the approach would lead to results with a low level of generality. Each organizational arrangement combines a variety of specific features and it is difficult--even granted clearcut empirical evidence--to explain why particular consequences came about and to state their research or policy implications.

The above notions concerning how differentiations may affect achievement can be taken as a starting point for an attempt to delineate the characteristics to look for when analyzing organizational differentiation.

3.1 Vertical and Horizontal Differentiation.

Organizational differentiation was referred to above as the assignment of students to groups for instructional purposes. There are two goals pursued in such an assignment. One is to reduce the amount of variation in whatever is assumed relevant for the amount of learning attempted in a given period of time, (e.g., an academic year). Differentiation initiated with this purpose in mind may be referred to as vertical differentiation. The other goal is to reduce the amount of variation in the kind of skill and knowledge the school attempts to transmit to the student within a given period of time. The resulting differentiation according to activities manifested in a curriculum will be referred to as horizontal differentiation.

A nearly universal form of vertical differentiation is age-grade grouping, although exceptions do exist (non-grading, multigrading). The underlying assumptions are that either biological age or "educational

age"--past educational experience--is an index of learning capacity. The former assumption is most important in lower grades, the latter in higher levels of education.

Because of its universality, age-grade grouping is taken for granted in the following. Vertical differentiation will be taken to mean further subdivisions according to assumed learning capacity. Vertical differentiation hence is synonymous with ability grouping in all its forms, including, of course, the groupings expressed by strongly selective European secondary school systems.

Grouping according to curriculum is most pronounced in the upper levels of the educational system. On these levels, horizontal differentiation usually reflects some concern for which future activities--occupational and other--the educational system prepares the student.

Horizontal and vertical differentiation often overlap, so that groups with different curricula are formed on the basis of learning capacity.

3.2 Inclusiveness

It was conjectured above that organizational differentiation affects individual academic development by determining the opportunities for obtaining various educational levels. The relevant characteristic shall be denoted the inclusiveness of the educational system. By degree of inclusiveness, we mean the number of opportunities assumed to be available at different educational levels. This may be difficult to measure directly, but one index would be the proportion of a cohort that obtains a given educational level in a particular educational system.

The educational level chosen for reference in measuring inclusiveness depends on the actual problem investigated. Here, where most often the reference is to primary and secondary schools, a reasonable measure of inclusiveness would be the proportion completing the highest secondary level.

3.3 Assignment Procedure

The assignment of students to groups directly determines the classroom composition relative to the composition of the cohort from which the class is drawn. The particular procedure used can be characterized by the criteria used in the assignment, and by the results of the assignment; i.c., the resulting classroom composition.

An important characteristic of the criteria used in the assignment is what may be denoted as the degree of electivity. By this is meant the degree to which students' own decisions are allowed to be a determining factor in the assignment to groups.

Electivity is related to whether vertical or horizontal differentiation is focused upon. Schools rarely rely exclusively on students' own self-evaluations in assigning them to groups on the basis of learning capacity, whereas student preferences often are allowed to play a major role in assignments to horizontally differentiated groups. Because of overlap between horizontal and vertical differentiation, it can be the case, however, that student preference is a necessary, but not sufficient condition for the assignment to groups, also when concern over learning capacity is involved.

Educational authorities have to rely on some index of learning capacity when the assignment is not wholly a question of student preferences. Most often this index will be one of three types: (1) past performance, as measured by grades obtained earlier in the educational career; (2) current achievement level, as measured by a test or exam; (3) a direct measure of cognitive skills, such as an I.Q. test.

These measures differ with respect to their dependency on non-cognitive factors relevant for learning, with I.Q. score presumably less dependent than the two others. Past performance and current achievement takes non-cognitive factors explicitly into account, as they are indices of learning accomplished. Past performance, as measured by obtained grades is, in addition, dependent on student-teacher relationships, as grades reflect teacher evaluations.

In general, not only is classroom composition affected with respect to the selection criterion used, but also with respect to other characteristics relevant for learning. This follows from the intercorrelation between the different determinants of learning, and the effect on classroom composition may be expected to be most marked when performance and achievement criteria are used.

The amount of homogeneity produced by the assignment in terms of the index of learning used, then, is an index of the amount of homogeneity produced with respect to other characteristics relevant for learning. The amount of homogeneity produced is an important characteristic in the analysis of how organizational differentiation affects classroom composition. We shall denote this aspect of the assignment procedure as its selectivity.

3.4 Scope and Rigidity

The vertical and horizontal differentiation determines which educational groups exist in an educational system. The assignment procedure determines the membership of these groups. It is important to add to these two a characteristic expressing to what extent a given group of students will be members of the same classroom over time, since this may be important for the interactive patterns of a student. This aspect of the organizational differentiation shall be denoted the scope of the differentiation.

A pattern or organizational differentiation is said to have a high scope if it obliges a student to spend most of his educational activities with the same group of students. The traditional European way of organizing secondary education is an example of a differentiation with a high scope; once assigned to a class students share most of their educational activities for as long as they are in the secondary school system with the same students.

Low scope implies that the classroom composition changes repeatedly. This may occur in combination with a horizontal differentiation, where the classroom varies according to subject, because students are allowed individual choice. Another possibility is assignment to different vertically delineated groups in different subject areas. The student may follow a more demanding section or stream in some subjects and less demanding classes in others, depending on his specific abilities.

Scope may be distinguished from the rigidity of differentiation. Rigidity is defined as the extent to which an individual student may transfer to another group than the one originally assigned to. Rigidity affects the stability of the classroom composition, too, but usually only a minority of students are involved.

3.5 The Relationship Between Dimensions of Organizational Differentiation

The various dimensions of organizational differentiation outlined above are not independent of each other. In a survey of patterns of differentiation, one would observe that certain combinations occur much more frequently than others. Part of the explanation for this phenomena seems to be the impact of social structure and educational philosophies on the educational structure, and we shall return to this factor at the end of the paper. Another cause of the interrelationship between the different dimensions is what might be called internal constraints, meaning that combinations of the various dimensions are more or less feasible.

It is a clear example of the latter phenomenon that the amount of selectivity in the assignment procedure will, in general, have consequences for the amount of inclusiveness obtainable in an educational system. A highly selective vertical differentiation precludes a high inclusiveness, since a majority of students do not have the possibility for obtaining a high level of education. Other factors, such as the distribution of aspirations may intervene, but a relation is obviously to be expected.

The extent of horizontal differentiation similarly places constraints on the amount of variation possible in scope. Little horizontal differen-

tiation forbids low scope, as there will be no basis for repeatedly changing the classroom composition to which a given student is exposed. The amount of horizontal differentiation in the same way determines the amount of electivity a student experiences, because of the general tendency only to allow maximum electivity in combination with horizontal differentiation.

4. The Effects of the Organizational Differentiation of Students

The conceptualization outlined above was a necessary preliminary to the main task of assessing effects of differentiation on achievement. The fruitfulness of this approach can now be evaluated. The next section is an attempt to formulate the desired set of hypotheses.

We shall proceed by dealing first with the possible direct individual level effects, and then with the possible effects derived from the impact of differentiation on classroom composition. Finally, we shall deal with the effects derived from a relation between patterns of differentiation and teacher behavior.

4.1 Individual Level Effects

The individual level determinants of learning are, as mentioned above, factors such as the students' aspirations, beliefs, values, and interests. If the pattern of differentiation to which a student is exposed affects these characteristics, they are consequently possible intervening variables in a relationship between organizational differentiation and learning.

4.1.1 Aspirations and Inclusiveness

A relationship was predicted earlier between the inclusiveness of an educational system and educational aspirations--so that the higher the proportion attaining a given educational level (i.e., the higher the inclusiveness), the greater the probability that an individual student will aspire to that level. This statement relies on the assumption that there is some relation between an individual's actual chance of attaining a high educational level and his aspirations. Such relationships are found in other contexts; for example, in the repeatedly found relation between social position and occupational aspirations, and seems reasonable to the point of being trivial. To the extent that variations in aspirations produces variations in individual achievement, a positive effect of inclusiveness on achievement should follow.

It might be argued against the latter assertion that increasing inclusiveness reduces the salience of achievement for educational attainment and therefore reduces the motivation to achieve. This may counteract the positive effect of inclusiveness predicted above. However, we propose that a certain level of aspiration, although not a sufficient condition, is a necessary condition for improving a student's achievement, given a certain level of ability. This role of aspirations indicates a mechanism linking inclusiveness and achievement. Inclusiveness--via its effect on aspirations--determines the effect of other factors on achievement, by either facilitating the operation of factors that improves a student's performance, in the case of high inclusiveness, or by hindering the operation of such factors in the case of low inclusiveness.

This mechanism seems especially relevant in connection with the effect of a student's family background on achievement. The well-known strong effect of family background on achievement can be assumed dependent on the inclusiveness of the school system. Family background is a source of influence on students' aspirations from the first day in school. Since parents as well as students will adjust their aspirations in accordance with the inclusiveness of the educational system, the effect of family background on student aspirations depends on the inclusiveness. The magnitude of the effect of family background on aspirations is certainly of importance for the effect of family background on achievement. It follows that high inclusiveness weakens the effect of family background on achievement by reducing an obstacle to academic growth for children with favorable family background--their lack of aspirations; low inclusiveness, conversely, can be expected to strengthen the effect of family background, since low initial aspirations are reinforced by low inclusiveness.

Other characteristics of the organizational differentiation are relevant for this process. The timing of a vertical differentiation is important, especially in the case where an early differentiation is characterized by some electivity because of the greater role parents may play in educational decision-making early in the educational career.

Empirical evidence for the above assertions is scant. This in part reflects the fact that major variations of inclusiveness are not usually found within a national educational system. Cross-national investigation of the problem is scant. However, the predicted relationship between

inclusiveness and aspirations does seem confirmed by an even casual comparison between the level of educational aspirations in Europe and in the U.S.A. And, data relevant to this issue may be found in a comparative study of Danish and American teenagers (Lesser and Kandel, 1968). This study reports a drastic difference in aspirations for university education between the two countries, reflecting the much lower inclusiveness of the Danish educational system.

Sweden did have a period where major variation in inclusiveness could be observed. A highly inclusive secondary system coexisted with a traditional European one in the early sixties. A comparison of the two systems by Harnqvist is especially relevant (Harnqvist, 1965).

Harnqvist was able to compare educational aspirations of students with similar background characteristics and ability in the two systems. The comparison took place at the sixth grade level, jsut before the major vertical differentiation took place in the traditional system. The educational aspirations were substantially higher for all children in the new system; the overall difference in the proportion of students who wanted a higher education was 11%. A similar difference was found between the proportions choosing academically oriented courses in later grades. These differences existed in all socioeconomic groups (the index of family background used), but a lower dependence of plans on family background was found in the new system. This pattern also came through when ability was controlled.

A follow-up study by Reuterbert (Reuterbert, 1968) indicates the validity of the above results by showing that the actual attendance at

institutions of higher education followed the same pattern. The differences in achievement between the two systems, in favor of the new system, cannot be taken as a clear-cut validation of the hypothesis advocated in this section. The studies did not separate the effects of inclusiveness on achievement from the effect of other accompanying structural differences.

4.1.2 Beliefs

In the Coleman Report a student's belief in being able to control his own environment is reported more highly correlated with achievement than any other non-intellectual characteristics of the student (Coleman et al, 1966). This correlation may reflect an effect of the rewards from good academic performance on the student's feeling of control. It may be assumed, however, that control over the environment affects achievement due to (1) its importance for the development of certain cognitive skills (Coleman, et al, 1966), and/or (2) its enhancement of the student's motivation to achieve. This latter notion is supported from studies of the relation between alienation and learning in a non-school setting (Seeman, 1963).

If a causal status for this variable is granted, it follows that characteristics of the organizational differentiation of students influencing this belief will be relevant for learning. A possible candidate is the degree of electivity of the organizational differentiation; high electivity places a student in a position where his own preferences determine which educational activities he will engage in. This greater objective control in turn may increase the student's feeling of control.

Some degree of electivity may exist in connection with vertical differentiation, but electivity is usually never complete here. Electivity may be complete in connection with horizontal differentiation. The organization of the horizontal differentiation is therefore especially relevant for the possible relation between organizational differentiation and feeling of control.

No study seems to have related feeling of control to the pattern of organizational differentiation.

4.1.3 Interests

The horizontal differentiation determines which educational activities a student engages in. Students differ with respect to their interests in different subject matter and their specific abilities vary. Hence, the horizontal differentiation may determine to what extent the student experiences a congruence between his interests, specific abilities and the activities he angages in. It is reasonable to assume that this degree of congruence affects how rewarding the educational experience is to the student, and in turn affects motivation, aspirations and learning.

High scope, in general, precludes a high degree of congruence between specific abilities, interests, and activities. It is unlikely that a specific combination of activities fits a sizeable number of students. Low scope should conversely enhance congruence, especially if combined with high electivity. High electivity is important, since the best judge of how rewarding educational activities are, is probably the student himself.

Several studies report that students tend to perform better when confronted with subject matter in which they have interests (Cronbach, 1949; Shepler, 1956). However, no systematic attempt to explore the role of the organizational differentiation exists. The argument is a rationale for several innovations in the structuring of the later stages of secondary schooling, e.g., the Swedish system. In earlier stages it runs counter to the high emphasis placed on providing children with a predetermined and uniform set of basic skills.

A somewhat similar argument can, of course, be advocated in support of a vertical differentiation in specific subject areas, creating a better fit between a student's level of ability and the difficulty of the material presented. The effect of such a procedure is difficult to predict. The possible gains may be counteracted by some of the mechanisms dealt with in the following sections. Attempts to evaluate the effect of achievement of vertical differentiation in subject matters yield no consistent results (Drews, 1962; Koontz, 1961; Borg, 1964).

There is an individual level of effect of vertical differentiation that in addition may be hypothesized to jeopardize the rewards derived from vertical differentiation in specific subjects. This is the possible effect on the student's self-image. The differentiation, in itself, may be experienced as a punishment or reward. Evidence here is inconclusive; Luchins reports a stigmatizing effect of streaming (Luchins and Luchins, 1948), Goldberg and associates, on the other hand, indicated that vertical differentiation tends to improve self-concept (Goldberg, Passow, and Justman, 1966). Several conflicting forces may be operating simultaneously; a stigmatizing effect can be counteracted by the change in compe-

tition in the ability grouped classes. In any case, it is doubtful whether self-image has a simple effect on achievement (McPartland, 1968).

4.2 Effects on Achievement Due to the Impact of Organizational Differentiation on Classroom Composition

The organizational differentiation by definition determines the composition of the classroom to which the student is exposed. A number of characteristics were identified above as relevant for the classroom composition. This section attempts to determine the effect of those characteristics on achievement.

The meaning of the phrase "impact on classroom composition" may need specification--impact in relation to what? The most reasonable answer seems to be impact in relation to the classroom composition, had there been random assignment to classes. In the case of random assignment, the classroom composition reflects the overall composition of the student body a school has as intake. This intake varies from school to school and from system to system, and the composition of the whole student body may correlate with the organizational differentiation. This source of variation obviously should be controlled for, when the effect of organizational differentiation is studied.

In the brief outline of the determinants of learning, the choice of classroom composition as a relevant characteristic was justified by stating that members of the classroom will be candidates for the formation of interactive relationships, and will therefore be potential sources of influence on individual determinants of learning.

From this it follows that the classroom effect of the organizational differentiation depends on two conditions: first, the extent to which students depend on the composition of their classrooms for the formation of interactive relationships; and second, the extent to which the impact of the organizational differentiation is an impact on the classroom composition with regard to learning-relevant characteristics that may get transmitted in interactive relationships.

4.2.1 The Formation of Within Classroom Interaction.

One of Homans' propositions states that the higher the frequency of interaction in the "external system," the higher the frequency of interaction in the "internal system" (Homans, 1951). In other words, the higher the frequency of interaction imposed on a group of people by virtue of a common set of activities, the greater the likelihood of the formation of primary interactive relationships.

It follows that the number of activities a classroom has in common tends to enhance the formation of within-classroom relationships. A predictor for the formation of interactive relationships that will reflect the composition of the classroom the student is placed in is, hence, the number of activities shared by the class.

Scope is clearly a relevant characteristic of the organizational differentiation here. Scope is defined as a measure of the amount of time and activities shared with the same group of fellow students. Since the impact of classroom composition is assumed to be determined by interactive relationships, high scope may be expected to facilitate the in-

fluence of characteristics of fellow students relevant for learning. Low scope, on the other hand, hinders the indentification of any classroom effect of the organizational differentiation. When the compositon of a student's classroom changes repeatedly, it is not possible to predict anything from knowledge of the classroom composition concerning individual achievement.

A similar argument could be made concerning the rigidity of the organizational differentiation. It may be held, however, that rigidity is never so low that more than a minority of students if affected. No educational study relates classroom interaction to variations in the scope of the grouping, although several studies of the effect of ability grouping on sociometric choices do exist (Borg, 1964; Drews, 1962). These studies are mainly preoccupied with the kind of choices formed under different arrangement and report that under random assignment to classes, popularity seems more dependent on ability than in classes grouped according to ability. This result is relevant for the arguments presented in the next section, but clearly has no bearing on the above assertions.

4.2.2 Impact of Classroom Composition

The important feature of the classroom composition is held to be the composition in terms of characteristics affecting student behavior as a result of his in-classroom interaction. This focuses the attention on such characteristics as the values and aspirations of classmates.

The role of the three characteristics of the assignment procedure delineated above--electivity, criterion, and selectivity--is discussed below. The research evidence is presented at the end. The bulk of

studies on ability grouping focuses on the problem of this section. No comprehensive review will be attempted, however. Most research ignores the mechanisms dealt with here, and their impact is therefore hard to evaluate. Extensive reviews of the literature can be found elsewhere (Goldberg, Passow, and Justman, 1966; N.E.A., 1968; Yates, 1966).

Electivity

Electivity is clearly relevant for the composition of the classroom in terms of non-intellectual determinants of learning. Electivity in connection with a vertical differentiation implies that student or parent aspirations are operative for the assignment to classes. The result will be classes more homogeneous in terms of aspirations or, in other words, a greater amount of between-class variation in aspirations.

This effect of electivity on the between-classroom variation in aspirations, in turn, may be expected to increase the between classroom variation in achievement. Depending on the scope, interaction in the more homogenous classroom will reinforce the typical level of aspirations for the classroom. Although the previously stated qualifications on the relation between aspirations and achievement also applies here, the mechanism should lead to a smaller within classroom variation in achievement.

As in the previous discussion of the role of aspirations as an intervening variable, family background is very relevant. There is evidence that on the same ability level, students with a less favorable

background are less apt to apply for high ability sections or streams than students from more favorable backgrounds. They, incidentally, are also more often rejected (Boalt & Husen, 1964). That elective assignments are more dependent on family background can be expected to reinforce the increase in the between class variation in achievement, since family background not only indicates aspirations, but potent other non-intellectual determinants of learning.

Electivity was held important for achievement before, as a result of its effect on student beliefs and interests. It is important to note that two quite different effects of electivity have been discussed. Here the effect is on the between classroom variation in achievement; the effect on student beliefs, in contrast, was one of increasing the achievement of all students. Here the concern is with electivity in connection with vertical differentiation, earlier the focus was on electivity in connection with horizontal differentiation.

Criteria and Selectivity

In a not completely elective assignment, the classroom composition is determined by the criterion used and the selectivity of the assignment.

Criteria have been classified according to the extent to which they express the operation of non-intellectual determinants of learning. We distinguished between direct measures of cognitive skills, such as an I.Q. score, measures of current achievement level as obtained on a test

or exam, and finally, measures of past performance, such as grades. The order in which the criteria are mentioned indicates the assumed degree of dependency on non-intellectual factors.

Because of the varying degree of dependency on non-intellectual factors, it can be expected that the choice of criterion will affect how relevant the classroom composition is for individual learning. As with electivity, the effect is on the between classroom variation in achievement; the more the criterion expresses non-intellectual characteristics, the greater the probability that his classroom interaction will expose him to an educational climate that will change his achievement toward the typical level of the class. The between classroom variation in achievement, hence, increases over and above what is accounted for by the assignment itself.

Family background can be seen as the main factor responsible for the intercorrelation between the different individual-level determinants of learning. Hence, the more performance is dependent on assignment criterion, the more family background will correlate with the assignment to classes. The validity of this argument can be inferred from the extensive research showing that family background correlates more with an indicator of academic capacity, the more this indicator depends on non-intellectual traits (Wieseman, 1964; Husen, 1966).

Selectivity has been defined as the amount of within-class homogeneity produced by the assignment. Greater selectivity therefore reinforces a tendency to an increase in the between class variation in achievement, over and above what is accounted for by the assignment.

High selectivity can be expected to increase the effect of family background on achievement. The magnitude of effect depends on the criterion used. This follows from the correlation between assignment and family background. In accordance with the mechanism outlined above, students with unfavorable backgrounds will be assigned to low achieving classes more often than students with a favorable background, regardless of ability. In other words, increasing selectivity, especially in connection with a performance-dependent criterion, will increase the inequality of educational opportunity over and above the degree accounted for by the family background initially.

It should be stressed at this point that the effects of the assignment procedure depends on the scope of the organizational differentiation. The effects are explained by the influence of the students' peers on learning. Only when a student's interactive relationships are formed within the classroom will the predicted effects come through.

Research Evidence

The three characteristics of the assignment procedure--electivity, criterion, and selectivity--have all been hypothesized to have an effect on the between-class variation in achievement and in turn on the relation between family background and learning.

With respect to electivity there is evidence that in connection with vertical differentiation electivity has a marked effect on the between-class variation in students' family background, over and above what ability differences accounts for (Husen, 1966). That electivity in

itself affects between-class variation in achievement would be extremely difficult, if not impossible to show, since the similar effects of selectivity also will be operative. The Swedish study from which the Husen reference stems does give data indicating an increase in the between-classroom variations in achievement over time in an elective and selective vertical differentiation, as compared to a random assignment (Husen and Svensson, 1960). The effect of electivity cannot be isloated, however. This study also gives support to the predicted effect of vertical differentiation on the relationships between family background and achievement. The effect, however, is reported as one on the achievement of children from less favorable background only. The achievement of children from a favorable background is largely unaffected by the organizational differentiation. This differential effect of school characteristics on children from different home milieus is in accordance with results obtained elsewhere (Coleman, et al, 1966).

Douglas' longitudinal study of the interplay between family background and schooling in English primary schools provides highly relevant evidence (Douglas, 1964). This study established the increase or decrease in test score between ages 8 and 11 for children streamed according to teacher assesment of ability--a criterion documented as highly dependent on non-intellectual characteristics. Holding initial ability level constant, it was found that students placed in the positively selected stream showed a gain in test score from age 8 to 11, while those placed in the lower stream experienced a decrease. This, of course, is an increase in the between-stream variation in test score. The assignment

to stream is strongly correlated with family background; and the result is that the correlation between family background and achievement increases over age. The streaming reinforces the process of social selection, as predicted above.

Douglas' study has been criticized for ignoring the regression effect (Horobin, 1967). The data presented in the critique (from a study in Aberdeen, Scotland) do not enable an investigation of the effect of streaming, however. The critique is inferred from tables showing that Douglas' main result concerning the effect of social class on development of ability (his data on streaming are only a subset) shows a pattern conforming to the one to be expected from a regression effect. Since streaming is correlated with social class, the regression effect is held responsible also for the streaming data. It may be argued against the critique that a statistical artifact--the regression effect--does not exclude a substantive process, but of course invites caution. Direct replications of studies seems in addition for superior to inferences from isolated, partly irrelevant data, when the validity of research findings is questioned.

Direct evidence on the predicted effect on between classroom variation in achievement can be found in several studies (Daniels, 1961; Blanford, 1958; Dockrell, 1964; Wilcox, 1964). All of these studies report an increase in the between-class variation in achievement as a result of a selective vertical differentiation, over and above what the grouping in itself accounts for. Blanford, using a covariance technique reports, for example, a highly significant F ratio between the variance in achieve-

ment scores for streamed and unstreamed children after 30 months. He does not find a significant difference in the level of achievement for the two groups, however.

The effect of the assignment procedure on the level of achievement is a function of the overall distribution of ability in the cohort since the above prediction solely concerned the variation in achievement. This assertion is often ignored in the research on the effects of ability grouping. This is one reason why conflicting results emerges. Another is the failure to take scope into account. It is significant that the above mentioned studies, with one exception, all are conducted outside the U.S. in school systems where the differentiation is known to have a high scope. Great variation in scope seems to exist in American schools both between schools and over grades, a state of affairs that complicates investigations of the effect of ability grouping. Borg, for example, in a large scale investigation of two school systems in Utah fails to find consistent results favoring ability versus random grouping (Borg, 1964). In the ability grouped schools, however, scope varies according to grades, and it is therefore hardly surprising that the overall picture is inconclusive.

A study that might be expected to be highly instructive is Goldberg, Passow, and Justman's large-scale investigation on the effect of ability grouping on some 3,000 students in New York (Goldberg, Passow, and Justman, 1966). This is one of the few large scale experiments that exists in the literature. Classes were formed with differing composition according to ability. (A good measure of selectivity thus exists.) The achieve-

ment gains over a two-year period show an overall pattern of relationship with selectivity (in this study called "range of ability in class") consistent with our prediction, although no direct test of the change in between-class variation in achievement was performed. The effects are small, however, and not always consistent, and the investigators warn against drawing any definite conclusions.

The author points out that the population, predominantly middle-class may be one reason for this result. As mentioned previously, school characteristics seem to have the most effect on students with unfavorable backgrounds and the absence of these children can therefore account to some extent for the results.

It is indicated in the study that substantial variation exists between classrooms in educational climates and in achievement, from the beginning of the experimental period. These variations are not analyzed, however, in connection with the grouping pattern, and it can be argued that if the initial between-classroom variations had been taken into account, more significant results may have emerged.

It should be mentioned, finally, that there is a characteristic other than scope that may account for the higher rate of inconclusive findings in studies performed within the U.S. in contrast to studies performed elsewhere. This is the general high inclusiveness of the American educational system. In the New York study it is nowhere indicated that students were aware of the implications of their assignment to a specific classroom, and there were probably no formal implications for the students' careers. Effects of classroom composition have been

argued repeatedly to be peer group effects, and aspirations of peers are highly relevant. The presumably general high level of educational aspiration, therefore, introduces an obstacle to obtaining major effects of differentiation. This obstacle is not present in many European school systems, where inclusiveness is low and ability grouping has clearly perceived consequences for the educational career.

4.3 Impact of Organizational Differentiation on Teacher Behavior

There are three mechanisms that may account for a covariation between forms of organizational differentiation and teacher behavior. First, there may be a relationship between differentiation and allocation of teachers to grades and classes. Second, teacher expectations of their students may be influenced by the organizational differentiation. Finally, the effectiveness of the teaching process in itself may bear a relationship to the way students are assigned to groups. Most of the research cited in the previous section is indirectly relevant for the hypotheses advocated below. The various studies seldom investigate the behavior of teachers as a function of the patterns of organizational differentiation examined. If the hypotheses below are valid, the results of these studies therefore may be attributed partly to variations in teacher behavior.

4.3.1 Allocation of Teachers

It seems safe to assume that the teaching of bright children universally commands higher prestige than the teaching of the less bright. Except when specific mechanisms are introduced against it, bright children therefore get more experienced and more competent teachers. The existence

of a vertical differentiation enables an allocation of teachers following the ability of students. Furthermore, it may be expected that the more selective this vertical differentiation, the greater the between-classroom variation in teacher competence.

Allocation of teachers is in the hands of educational authorities. They may pursue goals that lead to an allocation acting against the predicted effect--but this seems rare.

No direct evidence on the relation between teacher allocations and patterns of organizational differentiation exist. The validity of the above argument may be inferred, however, from the Coleman Report. (Coleman, et al, 1966). This study shows a clear relation between competence of teachers and the ability and background of students in the schools in which they are placed. In European systems differences in competence are often institutionalized according to the academic capacity of students. This is the case, for example, in Denmark.

Several studies (Boocock, 1966; Coleman et al, 1966) report an effect of teacher competence on achievement. In the Coleman report, competence was indicated by verbal ability, and a significant amount of the variation in the students' test scores could be explained by this characteristic. Teacher characteristics, in fact, accounted for more variation in student achievement than all other measured school characteristics combined, excluding student-body characteristics.

It follows that a vertical differentiation, due to its impact on teacher allocation, will increase the between-class variation in achieve-

ment over and above what the assignment in itself accounts for. This effect may be expected to vary positively with the selectivity of the assignment.

4.3.2 Teacher Expectations

Rosenthal's study of the effects of teacher expectations on learning seem to support his main hypothesis--that there is an effect of the teacher's expectations regarding the performance of students on these students' subsequent achievement (Rosenthal, 1968). Students' performance tends to fulfill teacher expectations. The study has severe methodological problems, but the conclusion seems plausible, although replications are desirable.

A vertical differentiation of students is meant to provide teachers with a clue as to the ability of their students. That this affects their expectations regarding the performance of students is a rather trivial assertion. A vertical differentiation therefore should produce teacher expectations that reinforce the achievement differences between classes accounted for by the assignment.

It is a further contribution to this effect of differentiation on between-class variation in achievement that teachers often play a crucial role in the assignment to classes. Teachers can be expected to be concerned about not disqualifying their own capacity to make assignments and evaluate students accordingly. The rigidity of a vertical differentiation, hence, should be high when teacher evaluations plays an important role. This assertion is confirmed by Douglas' study. A rate of

transfer from 1% to 2% between streams is reported here, and if anything, the transfers that took place tended to favor children with favorable home background (Douglas, 1964).

4.3.3 Teaching Methods

The most frequent argument in favor of a vertical differentiation is the assertion that teaching is more effective in homogenous classrooms. Teachers themselves seem to support this view strongly (Daniels, 1961).

It is outside the scope of this paper to evaluate this assertion, since it is a pure pedagogical question if taken literally--which it should be in view of this paper's analysis. It can be mentioned, however, that no study on the effects of ability grouping measures characteristics of teaching methods. Goldberg and his associates observed that teachers in general fail to accomodate their teaching to the composition of the classroom, but they do not have data on this assertion (Goldberg, Passow, and Justman, 1966).

It may be conjectured that there is not meaningful answer to the question of what form of differentiation facilitates the most effective teaching methods, other things being equal. There may be techniques effective for each grouping pattern separately, but then other things are never equal as this paper has attempted to show, and the universally most effective (but not efficient) method seems to be one that involves pedagogical differentiation; i.e., individualized attention.

5. Conclusion

The analysis of the effects of variations in the organizational differentiation of students has been completed with a very brief treatment of the argument that teachers can teach more effectively in homogenous classrooms. This argument, as mentioned before is the most frequently met in discussions and research on organizational differentiation. The large majority of studies address themselves to this argument, and focus on the virtues of homogeneously versus heterogeneously grouped classrooms, without ever measuring teacher behavior.

The brief treatment of the problem of teaching effectiveness may seem deplorable, since the manifest goal of introducing various grouping arrangements often is to improve the effectiveness of teaching. This paper, however, has focused on the latent consequences of various patterns of organizational differentiation. These latent consequences are not to be ignored, given the questionable validity and meaningfulness of the argument on teaching effectiveness. They reflect forces influencing achievement, regardless of how the teacher teaches, and imposes conditions for classroom teaching that may override many instructional innovations.

It has been asserted above that certain characteristics of the organizational differentiations have a direct effect on the level of achievement of students. Such effects are predicted from the degree of electivity in connection with the horizontal differentiation and the spread of the horizontal differentiation--whether it enables students to develop their specific abilities, and fulfill their interests.

The major part of the proposition presented above has dealt with the effect of characteristics of the organizational differentiation on the between-class variation in achievement. The degree of electivity in vertical assignments, the selectivity of the assignment, and the degree to which assignment criteria are dependent on non-intellectual characteristics have all been hypothesized to have an effect on the amount of between-class variation in achievement, over and above the variation accounted for by the assignment. This mechanism, of course, will have an effect on the level of achievement dependent on the overall distribution of ability.

The effects on the between-class variation in achievement in turn have been related to the family background of students. It has been argued that an increased between-class variation in achievement results in an increase in the correlation between family background and achievement. In addition, another characteristic of organizational differentiation--its degree of inclusiveness--has been hypothesized as being relevant to this correlation. The organizational differentiation hence is important for the degree of inequality of educational opportunity for students from different backgrounds, that may be observed in an educational system.

Organizational differentiation, therefore, should be an important instrument for an educational policy that attempts to equalize opportunity. This instrument is well suited for this purpose. The organizational differentiation is exclusively in the hands of educational authorities, empowered to make decisions about the form of differentiation.

An educational policy using organizational differentiations as an instrument must take into account that not every conceivable pattern of organizational differentiation can be implemented. What was earlier called internal constraints (section 3.5) has to be faced, as they indicate which combinations of the dimensions of the organizational differentiation are feasible.

There is also a set of constraints that can be termed external. These are constraints imposed from the society at large, or from typical structural characteristics of schools other than differentiation.

An obvious example of the latter set of constraints is the typical size of the student body, that sets a limit for how far the differentiation can go if a minimum number of students is deemed necessary to constitute a class. The typical architectural design in the same way poses restructions. The amount of horizontal differentiation and and the amount of electivity that may go into it, is restricted by the administrative efficiency of schools. Finally, the supply and qualifications of teachers will constrain how many and what kind of horizontally and vertically delineated classes can be created.

The level of economic and technological development is an example of a constraint imposed by the society at large. This level determines the demand for the output of the educational system. Especially in the upper level of the educational system, where the job preparing function has a high impact, these manpower needs are important for which pattern of organizational differentiation is justifiable.

The occupational structure is a major basis for the distribution of stratified values such as prestige, wealth, and power. The organizational differentiation will therefore tend to reflect the social structure of a society in its major aspects. This relationship is rather complicated, however. The prevailing educational ideology in a society affects how manpower needs get transformed into educational policy, and the prevailing ideology constrains whatever suggested policy can be implemented. Educational policies regarding the organizational differentiation, therefore, are not directly constrained by the social structure. Factors such as the value placed on providing a mass education, also on higher levels, are certainly of importance, and it may be impossible to show any direct relation between occupational structure and such values. Although there is a marked contrast between American and European educational ideology, it is difficult to show any marked differences in occupational structure (Lipset and Bendix, 1959).

The relationship between social structure and organizational differentiations is furthermore complicated. The distribution of the output of the educational system, determined by the organizational differentiation, in itself can be expected to affect the social structure due to the impact of the organizational differentiation on educational opportunity.

Macro-sociological research on the interplay between social structure and educational structure would seem fruitful in view of these problems. More pressing, perhaps, is firmer empirical validation of the hypothesized mechanisms mediating between organizational differentiation and achievement.

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